IMP. BUR.
10 JUL.1915
ENTOM.

CIRCULAR No. 32 JUNE, 1915

EXAMINED.

ALABAMA

# Agricultural Experiment Station

OF THE

## Alabama Polytechnic Institute

AUBURN

---

# Fly Baits

---

BY
J. E. BUCK
Assistant Entomologist

---

Montgomery, Ala.
The Paragon Press.
1915

## COMMITTEE OF TRUSTEES ON EXPERIMENT STATION.

Hon. R. F. Kolb ..... Montgomery

Hon. A. W. Bell ..... Anniston

Hon. J. A. Rogers ..... Gainesville

## STATION STAFF.

C. C. Thach, President of the College.
J. F. Duggar, Director of Experiment Station and Extension.

### Agriculture:

J. F. Duggar, Agriculturist.
E. F. Cauthen, Associate.
M. J. Funchess, Associate.
J. T. Williamson, Field Agent.
D. J. Burleson, Assistant.
O. H. Sellers, Assistant.
H. B. Tisdale, Assistant.

### Veterinary Science:

C. A. Cary, Veterinarian.
H. C. Wilson, Hog Cholera Expert.*
L. F. Pritchett, Assistant.

### Chemistry:

J. T. Anderson. Chemist, Soils and Crops.
C. L. Hare, Physiological Chemist.
S. Adler, Assistant.

### Junior and Home Economics Extension:

L. N. Duncan, Superintendent. *
Miss Madge J. Reese, Assistant. *
J. C. Ford, Assistant. *
I. B. Kerlin, Assistant. *
Nellie M. Tappan, Home Economics. **

### Botany:

J. S. Caldwell, Botanist.
A. B. Massey, Assistant.

### Plant Pathology:

F. A. Wolf, Pathologist.

### Horticulture:

Earnest Walker, Horticulturist
J. C. C. Price, Associate.
G. V. Stelzenmuller, Field Agent.

### Entomology:

W. E. Hinds. Entomologist.
F. L. Thomas, Assistant.
E. A. Vaughan, Field Asst.

### Animal Industry:

G. S. Templeton, Animal Husbandman.
E. S. Girton, Assistant.
N. A. Negley, Assistant.*
E. Gibbens, Assistant.

*In cooperation with United States Department of Agriculture.
**In cooperation with Alabama Girl's Technical Institute.

# FLY BAITS.

By J. E. Buck, Assistant Entomologist.*

Fly traps of various types have come into use in recent years and have been used quite extensively in campaigns against the house fly (*Musca domestica.*) No very extensive efforts have been made to determine the most attractive baits to use. The work of Dr. A. W. Morrill of the Arizona Experiment Station has, perhaps, been the most extensive effort made along this line. Where flies are numerous, almost anything which they ordinarily visit will attract them, but with many other attractions about it is certainly desirable to have the most attractive bait possible for use in traps.

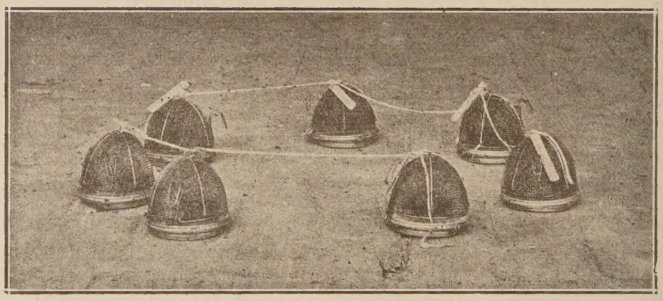
The writer conducted over fifty tests during the summer and fall of 1914 about the barns of the Alabama Experiment Station for the purpose of determining the relative attractivness of a number of fly baits.

## METHOD OF MAKING TESTS.

Small, oval, wire traps of exactly the same size and construction were used in making these tests. The bait pan to each trap held about one-eighth of a pint. The tests were made in series consisting of from one to five tests. Each trap was numbered and a certain bait assigned to each trap by number. This bait was used in its own trap for as many tests as were included in a series. From four to eight traps and as many baits were used at one time, the same number being used throughout a given series. Where liquid was called for, a little less than one-eighth of a pint was used, in most cases; and, in each instance, quantities of bait as nearly equal as possible were put in contest. After all pans were properly baited, each was placed under its own trap.

The traps were exposed in a small circle, being placed from eight to twelve inches apart. The accompanying photograph shows the traps set. The baits were exposed from two to five

* On leave of absence.



hours in a test and from two to eighteen hours in a series. After the traps were exposed a definite time, the holes by which the flies gained entrance were stopped, the traps placed in a fumigation tank and the flies killed with carbon disulphide. The flies were then counted and the number attracted by each bait was recorded. The total number of flies caught by all baits in each test was used as a basis for estimating the per cent caught by each bait in each test.

The grand total of all flies caught in all the tests of a series was taken as a basis on which to calculate the percentage of the total number caught by each bait in all the tests of a series. In all tests, the baits were exposed 138 hours, catching a total of 104,041 flies. This makes an average of 753 per hour for all traps, or over 100 per hour for each trap used. The number caught, however, depends on the number of flies present. In the first test, one of these small traps, holding about a quart, caught over 1700 flies in two hours. Flies were much more numerous then, however, than at any other time during the season.

Twelve series of tests were made. Summary tables of two of these are given to illustrate the method of work. Series 9 included some of the best baits of all preceding tests and eight new traps were used in making the tests. The regular use of the traps was found to affect the results slightly. In fact, the action of chemicals on one of the trap pans made it repulsive to the flies and consequently useless. The baits in series 9 (See Table II) are among the very best, consequently the per-

centage results are rather close. The results of this series were used as a check on all other tests. In series 5, (See Table I) the variations in results are much more noticeable, as is the case in very many of the other tests made.

The results in Table I. were obtained by using each trap in four tests totalling twelve hours each; those in Table II. by using each trap in five tests totalling eighteen hours each.

TABLE I. RESULTS OF TESTS IN SERIES 5.

| KIND OF BAIT. | No. of Trap | Total No. Flies Caught | Per cent of total caught by each bait of grand total of series |
|---|---|---|---|
| Light bread, 10% grain alcohol, and sugar | 1 | 1031 | 10.23 |
| Light bread, 5% grain alcohol, and sugar | 2 | 1809 | 17.95 |
| Light bread, sweet milk containing 10% grain alcohol, and sugar | 3 | 2463 | 24.45 |
| Light bread, sweet milk containing 10% formaldehyde. | 4 | 571 | 5.66 |
| Light bread, sweet milk containing 10% formaldehyde, and sugar | 5 | 1154 | 11.55 |
| Decayed banana, water, and a little sugar | 6 | 1392 | 13.82 |
| Decayed banana 10% formaldehyde, and sugar | 7 | 1652 | 16.40 |

TABLE II. RESULTS OF TESTS IN SERIES 9.

| KIND OF BAIT. | No. of Trap | Total No. Flies Caught | Per cent of tatal caught by each bait of grand total of series |
|---|---|---|---|
| Light bread, sweet milk containing 10% grain alcohol, and sugar | 1 | 2377 | 13.78 |
| Light bread, equal parts of sweet milk and water containing 5% formaldehyde, and sugar | 2 | 2549 | 14.78 |
| Light bread, buttermilk, and sugar cane syrup | 3 | 1281 | 7.42 |
| Light bread, 5% grain alcohol, and sugar | 4 | 2022 | 11.72 |
| Light bread, sweet milk containing 5% grain alcohol, and sugar | 5 | 2167 | 12.55 |
| Light bread, butter milk containing 3% grain alcohol, and sugar cane syrup | 6 | 2264 | 13.12 |
| Light bread, butter milk containing 7% formaldehyde, and sugar cane syrup | 7 | 2844 | 16.43 |
| Light bread, apple vinegar and sugar | 8 | 1739 | 10.08 |

## RESULTS OF THE EXPERIMENTS.

Space will not permit giving the tables showing details of the experiments, consequently only the more important results can be given here. The following are the most important baits, approximately in the order of their attractiveness. All of these baits have been thoroughly tested in comparison with each other, and with still others, and can be thoroughly relied upon for good results.

First. Light bread, buttermilk (to which 7 per cent. commercial formaldehyde (40 per cent.) has been added,) and a little sugar or syrup—preferably syrup.

Second. Light bread, equal parts of sweet milk and water to which has been added 5 per cent. commercial formaldehyde (40 per cent.) and a little sugar.

Third. Light bread, sweet milk containing 10 per cent. grain alcohol (95 per cent.) and a little sugar.

Fourth. Light bread, buttermilk to which has been added 3 per cent grain alcohol (95 per cent.) and a little sugar or syrup—preferably syrup.

Fifth. Light bread, sweet milk containing 5 per cent. commercial formaldehyde (40 per cent.) and a little sugar.

Sixth. Light bread, buttermilk, sugar or syrup, preferably syrup. This bait, when left in bait pan several days, fresh bait being added as needed, is very attractive. It is improved by the fermentation.

Seventh. Light bread, 3 per cent. to 8 per cent. grain alcohol (95 per cent.) and a little sugar.

Eighth. Light bread, fresh apple vinegar, and a little sugar.

Ninth. Light bread, 7 per cent. commercial formaldehyde (40 per cent.) and a little sugar.

Tenth. Decayed banana. This makes fairly good bait alone, but its value is considerably increased by adding a little water and sugar, or 5 per cent formaldehyde and sugar.

Eleventh. Fresh yeast, light bread, water and a little sugar.

Twelfth. Fish scraps. This bait was tested once with three other baits previously tested. Of the 1759 flies caught this bait caught 13.24 per cent. decaying banana 19.72 per cent. butter-

milk with 3 per cent. grain alcohol added used on light bread, with a little sugar added, caught 43.21 per cent. and sweet milk containing 5 per cent. formaldehyde used on light bread with a little sugar, caught 23.82 per cent. Fish scraps have been used with splendid results about cities, and these figures show how this bait compares with some of the best baits found in these tests.

Light bread was found to be an excellent medium for flies to crawl upon and fresh yeast light bread with a little water and sugar, makes fairly good bait.

In using the liquid baits, the light bread is first put in the bait pan; the liquid bait which should be kept made up in sufficient quantity, and kept tightly closed, is poured on the bread, and the sweetening is then added. For a bait pan holding about one-eighth of a pint, two dessertspoonfuls of white sugar should be used: slightly more syrup than sugar should be used. Syrup gives better results with the buttermilk baits, sugar with other baits.

Buttermilk should be fresh when alcohol or formaldehyde is added. The sweet milk loses nothing in value by standing a day or two before adding the alcohol or formaldehyde. Buttermilk should have 7 or 8 per cent. of commercial formaldehyde for best results; sweet milk 5 per cent.

Not over 4 per cent. grain alcohol (95 per cent.) should be used in buttermilk. Ten per cent. grain alcohol was found to give the best results in sweet milk. In water alone, not less than 3 per cent. nor over 8 per cent. alcohol should be used.

Rusty pans should not be used for bait. Bait receptacles should be made of glass or some substance not easily corroded, as chemicals may act on tin or zinc and prove repulsive to the flies.

There is some advantage in leaving the old baits in pans several days, but baits should not be allowed to become too old or dry. Plenty of fresh bait should be added regularly and all old bait should be thoroughly cleaned out about once a week.

Sugar was found to be a very valuable addition to the baits, in some cases increasing their attractiveness from 10 per cent. to 20 per cent.